



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/523,642

11/17/2005

Alexia Balland-Longeau

10404.026.00

1261

30827

7590

07/22/2009

MCKENNA LONG & ALDRIDGE LLP
1900 K STREET, NW
WASHINGTON, DC 20006

EXAMINER

HEINCER, LIAM J

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

07/22/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/523,642	Applicant(s) BALLAND-LONGEAU ET AL.	
	Examiner Liam J. Heincer	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 11 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 11, 2009 has been entered.

Priority

The Office apologizes for inadvertently omitting the response to foreign priority in the previous action. The applicant is advised that although a copy of the priority document should have been received from the World Intellectual Property Organization, no such copy has been received by the US Patent Office at this time.

Claim Objections

Claims 11 and 15 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 11, which is the method of making the polymer of claim 1, recites structural features that are broader than in the parent claim. Claim 11 requires groups of the formula -W1-A-W1 to remain on the polymer backbone. However, W1 is a genus of the species claimed in claim 1. W1 has been defined as being an arylene group. However, claim 1 requires a specific arylene group with at least one acidic substituent. Therefore, the structure of claim 11 is broader than that of its parent claim, claim 1.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 11 and 15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 11 has been amended to recite the limitation “a remaining group after the nucleophilic substitution being -W1-A-W1 and A corresponding to the same definition A of claim 1”. There is no support in the original specification for a structure of the -W1-A-W1, before or after the nucleophilic substitution reaction.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Considering Claims 11 and 15: Claim 11 has been amended to recite the limitation “a remaining group after the nucleophilic substitution being -W1-A-W1 and A corresponding to the same definition A of claim 1”. The terminology “a remaining group” is indefinite. It is not clear from the claim language where the group remains. For instance, the group can be on the polymer backbone, or it could be a compound left in the reaction mixture independent from the polymer.

Art Unit: 1796

For the purpose of further examination, the groups is being interpreted as being attached to the polymer backbone.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

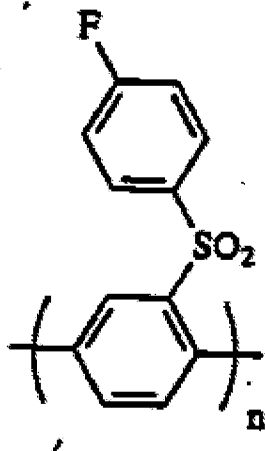
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3, 4, 7, 8, 11, and 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloom et al., (Functional Derivatives of Poly(4'-Fluoro-2,5-Diphenylsulfone via Nucleophilic Aromatic Substitution) in view of Charnock et al. (WO 01/70858).

Considering Claims 1, 3, 7, 11, and 15: Bloom et al. teaches a process for producing a polymer comprising reacting a base polymer of

Art Unit: 1796



with a hydroxyl functional aromatic group (Scheme 1). Bloom et al. also teaches the aromatic group as containing functional groups to alter the properties of the base polymer (Conclusion). Bloom et al. teaches the substitute would be less than quantitative, thereby leaving units of the fluorinated precursor (Conclusion). As Bloom et al. teaches attaching an aromatic group to the backbone through an ether linkage (Scheme 1), the polymer would contain groups of the formula W1-A-W1.

Bloom et al. does not teach the functional group as being one of the claimed acids. However, Charnock et al. teaches a sulfonated, phosphorylated, or carboxylated (5:5-10) poly-1,4-phenoxybenzoylphenylene (3:20-22, Figure 3b). Bloom et al. and Charnock et al. are combinable as they are concerned with the same field of endeavor, namely phenylene polymers. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have sulfonated, phosphorylated, or carboxylated the polymer of Bloom et al. as in Charnock et al., and the motivation to do so would have been, as Charnock et al. suggest, to provide ion exchange sites on the polymer (5:5-10).

Considering Claim 4: As the nucleophilic substitution reaction would occur randomly, the polymer would be random.

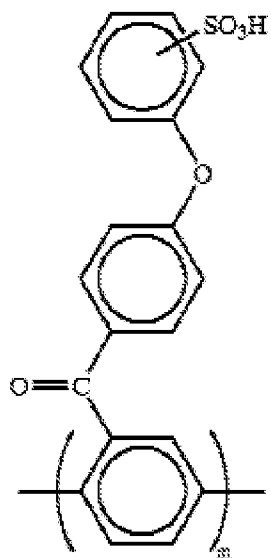
Considering Claim 8: Bloom et al. teaches that the linking group between the backbone and the first aryl group can be a CO linkage (Conclusion). Bloom et al.

Art Unit: 1796

additionally teaches embodiments where the hydroxyl aromatic compound used in the substitution is para substituted (Scheme 1).

Claims 1-5, 7, 8 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asano et al. (US 2002/0172850) in view of Bloom and Sheares (Macromolecules 2001, 34, 1627-1633) as evidenced by Cui et al. (WO 01/42336) and Bloom et al., (Functional Derivatives of Poly(4'-Fluoro-2,5-Diphenylsulfone via Nucleophilic Aromatic Substitution). Note: US Pat. 6,790,931 is being used as an English language equivalent of WO 01/42336 and all citations will be directed towards the US document.

Considering Claim 1, 3, 7, and 8: Asano et al. teaches a polymer with a repeat unit of



(¶0033)

Asano et al. does not teach a repeat unit of formula II. However, Bloom and Sheares teaches forming an ether substituted polybenzophenone (Conclusions) through a nucleophilic substitution between a fluorine functional polymer and a hydroxyl aromatic compound (scheme 1). As Bloom et al. shows that the substitution is not quantitative when using benzophenones (Conclusions) there would remain units with the fluorine atom attached after the reaction. Asano et al. and Bloom and Sheares are analogous as they are concerned with

Art Unit: 1796

the same field of endeavor, namely the formation of substituted polybenzonphenones. It would have been obvious to a person having ordinary skill in the art at the time of invention to have used the production method of Bloom and Sheares to form the polymer of Asano et al., and the motivation to do so would have been, as Bloom and Sheares suggests, the methodology allows for good control of the substitutions and improves the thermooxidative stability of the polymer (Introduction). As Cui et al. teaches that use of sulfonating agents as in Asano et al. can result in long reaction times and polymer degradation (1:34-2:38) a person having ordinary skill in the art at the time of invention would further be motivated to find reaction mechanisms avoiding the use of sulfonating agents.

Considering Claims 2 and 14: Asano et al. teaches the molecular weight as being greater than 1,500 to 200,000 (¶0432).

Considering Claim 4: Asano et al. teaches a block copolymer (¶0434).

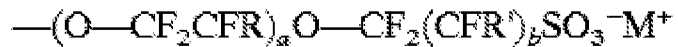
Considering Claim 5: Asano et al. teaches a two component copolymer where the sulphonated unit comprises 50 to 60 mol% of the polymer (¶0027).

Considering Claims 12 and 13: Asano et al. teaches the use of the polymer as membrane for use in a fuel cell (¶0002).

Claims 6, 9, and 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Asano et al. (US 2002/0172850) in view of Bloom and Sheares (Macromolecules 2001, 34, 1627-1633) as evidenced by Cui et al. (WO 01/42336) and Bloom et al., (Functional Derivatives of Poly(4'-Fluoro-2,5-Diphenylsulfone via Nucleophilic Aromatic Substitution) as applied to claim 1 above, and further in view of Doyle et al. (US Pat. 6,025,092).

Considering Claims 6, 9, and 10: Asano et al. and Bloom and Sheares collectively teach the polymer of claim 1 as shown above.

Asano et al. does not teach the pendant acid as being of the claimed type. However, Doyle et al. teaches using a pendant group of



in an ion exchange membrane (2:46-55). Asano et al. and Doyle et al. are combinable as they are concerned with the same field of endeavor, namely ion exchange membranes. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have used the pendant group of Doyle et al. in the place of the sulphonic acid of Asano et al., and the motivation to do so would have been, as Asano et al. suggest, the excellent proton conductivity of the perfluorinated polymer electrolytes (¶0005).

Response to Arguments

Applicant's arguments, see pages 7-9, filed May 11, 2009, with respect to the rejection(s) of claim(s) 1-10 and 12-14 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Asano et al. and Bloom and Sheares.

Applicant's arguments filed May 11, 2005 with respect to the rejection of claim 11 have been fully considered but they are not persuasive, because:

A) In response to applicant's argument that neither Bloom et al. or Charnock et al. teach the combination of formula I and formula II, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Bloom et al. teaches the claimed process of attaching functional groups to a polyphenylene backbone through nucleophilic, but does not teach the claimed functional group. Charnock teaches the desirability of

Art Unit: 1796

attaching the claimed functionality to a polyphenylene backbone. As such, the combination of Bloom et al. and Charnock would meet the claimed limitations.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Liam J. Heincer whose telephone number is 571-270-3297. The examiner can normally be reached on Monday thru Friday 7:30 to 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on 571-272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Eashoo/

Supervisory Patent Examiner, Art Unit 1796

LJH

July 15, 2009